

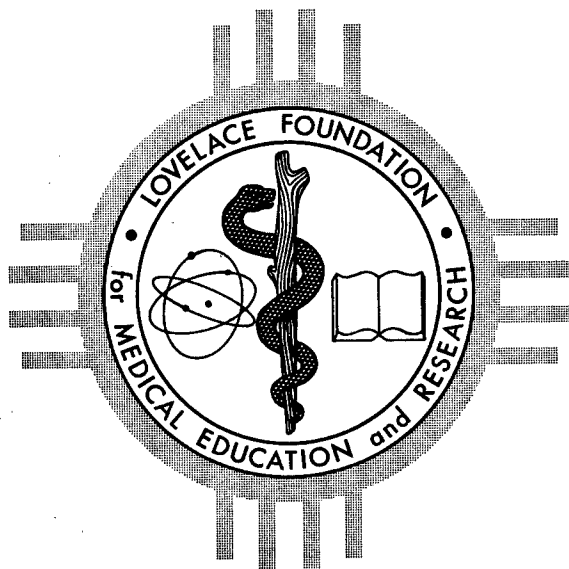
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LOVELACE FOUNDATION

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Albuquerque, New Mexico

MANAGEMENT PROCEDURES FOR ANIMAL COLONIES SERVING THE FISSION PRODUCT INHALATION PROGRAM

by
H. C. REDMAN
AND
J. H. SHERROD

August 1965

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FISSION PRODUCT INHALATION PROGRAM

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H. C. Redman and J. H. Sherrod

Submitted as a

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ABSTRACT

The management procedures for the animal colonies are described in detail. For the large animal colony, those required for routine operation of the breeding, puppy and life span kennels are enumerated. Within the small laboratory animal colony, those necessary for the management of the isolation, stock and life span rooms are listed. The preventive medicine procedures and those required for the maintenance of medical history records are also included.

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MANAGEMENT PROCEDURES FOR ANIMAL COLONIES SERVING
THE FISSION PRODUCT INHALATION PROGRAM

by

H. C. Redman and J. H. Sherrod

I. INTRODUCTION

The Lovelace Foundation has initiated a long-term program for the Division of Biology and Medicine of the Atomic Energy Commission to assess the biological effects of inhaling fission products singly and as mixtures. This required, among other things, the establishment of an experimental animal colony under the care and management of the Department of Veterinary Medicine. The animal quarters which are integrated with other laboratory buildings at a field sight on Sandia Base have been previously described¹.

Established management procedures in conjunction with an adequately designed facility, makes possible the production and maintenance of animals within a "standardized" environment, thereby reducing the chance of the introduction of extraneous outside stresses to the animals. Experimenters are thus assured a more "biologically documented" healthy experimental subject.

As the management of this colony has interested many visitors and relevant information has been requested by a variety of individuals, it was thought that a documentation of established procedures would be useful to other laboratories, as well as help locally in the indoctrination of new employees, particularly those of the Department of Veterinary Medicine.

The present procedures for the operation of the experimental animal facility serving the Fission Product Inhalation Program are presented below.

II. LARGE ANIMAL COLONY

A. Daily Rounds

1. The veterinarian on duty makes daily rounds of the kennels, isolation wards, canine metabolism rooms and interim facility.
2. Comments documented into a portable recorder^{*} may include:
 - a. Observations regarding the health of the animals
 - (1) Those made by the veterinarian during rounds
 - (2) Those made by caretaker personnel during the previous 24 hour period and recorded in the area log book which is maintained at each individual kennel.
 - b. Treatment of animals by veterinarian
 - c. Initiation of work orders
 - (1) Changes in rations
 - (2) Orders for medication
 - (3) Orders for laboratory work
 - (4) Kennel management problems
 - (5) Miscellaneous

B. Kennel Areas

1. Protective uniforms are worn by all animal caretakers.
2. Germicidal foot wash is maintained at all times just inside the kennel door for disinfection of shoes.
3. Hands are washed upon entering and leaving kennels.
4. Cleaning is done utilizing hot water and a Mikroquat^{**} dispenser as follows; the inside area of the kennel is washed down initially during the morning, this is repeated during the day as necessary to keep the area in a clean condition. The outside runs are washed down from the elevated ramp initially during the morning and repeated during the day as needed. Extreme care is taken to prevent getting water on

^{*}International Business Machines Corp., New York City, New York.

^{**}Economics Laboratory, Inc., Saint Paul, Minnesota.

the animals.

5. Animal caretakers note any repairs to be made in kennels and bring this to the attention of the chief animal caretaker.
6. Visual examinations are made of all dogs and any abnormalities are called to the attention of the chief animal caretaker and posted in the area log book.
7. Animals are fed daily as instructed (See E. Feeding).

C. Isolation Rooms

1. Attire
 - a. Coveralls are placed over the uniform before entering the ward. These are obtained from the wall cabinet.
 - b. Disposable shoe coverings are put over the rubber shoes before entering the ward. These are obtained from the wall cabinet.
2. Hands are washed before entering.
3. Visual observations of all animals for any detectable deviation from their normal condition, are made upon entering the ward.
4. Feeding
 - a. Dogs are fed the prescribed rations. Feed is mixed in the mixing room and taken to isolation room in disposable plastic bags.
 - b. The feed bowl is allowed to remain in the cage for one hour and then removed.
 - c. The bowls are washed with detergent between each feeding period.
 - d. Water bowls are washed and refilled.
5. Waste material is collected and placed in the red plastic bag and the top of the bag is closed with tape. The bag is placed outside the back door for collection and disposal.
6. Clean bedding is placed within the dog cage.
7. Immediately upon leaving the isolation room into the examination room, the isolation coveralls are removed and placed in the red plastic bag under the sink.

8. Disposable shoe covers are immediately removed and placed in the small plastic bag provided.
9. Hands are washed before leaving the examination room.

D. Canine Metabolism Rooms

1. Urine and fecal samples are collected according to the standard collection procedure². These are used to determine their isotopic content.
2. A clinical record chart is maintained daily on each of the animals within the metabolism cages. This chart contains the following information:
 - a. The presence or absence of a nasal discharge.
 - b. The presence or absence of an ocular discharge and the general condition of the eyes.
 - c. The presence or absence of feces. A description of the condition is recorded if present.
 - d. A normal or abnormal skin and hair coat.
 - e. The degree of appetite.
 - f. The presence or absence of a cough. A description of the severity is recorded if present.
 - g. The pulse rate.
 - h. The respiratory rate.
 - i. The rectal temperature.

E. Feeding

1. Amount
 - a. All dogs are normally fed a standard ration of 12 ounces of the feed mixture once a day. In place of the standard ration, one pound of oxtails are fed one day a week to the colony with the exception of the dogs in the isolation rooms, the pregnant and lactating bitches and the post-exposure dogs in the metabolism cages.
 - b. Exceptions to the above standard ration are as follows:
 - (1) Pregnant bitches are fed a standard ration twice a day.

- (2) Pups in litter groups are fed twice a day from weaning to three months of age an amount sufficient for the litter size.
- (3) Pups, three months to ten months of age, are fed a standard ration twice a day.
- (4) Bitches weaning litters are given a decreased ration for the first four days following weaning to suppress milk production.
- (5) Special amounts of rations, special diets and other changes in the standard ration may be prescribed by the veterinarian when medically necessary.

2. Ingredients

- a. One (1) pound (1%) vitamin mineral supplement^{*}.
- b. Forty (40) pounds (60%) dry ration^{**}.
- c. Twelve (12) pounds (20%) U. S. D. A. inspected ground beef mixture.
 - (1) 25% heart
 - (2) 25% tongue
 - (3) 50% carcass trim (not to exceed 35% fat)
- d. Three (3) quarts (19%) hot water.

3. Preparation

- a. Three quarts of hot water are mixed with one pound of vitamin mineral supplement in a 60 quart mixing bowl by use of a Hobart mixer^{***}. Twelve pounds of ground beef are added and mixed. Forty pounds of dry ration are added and mixed.
- b. Rations for the entire colony are mixed in the food preparation room and delivered to the proper areas. Feed is delivered to the isolation wards and to the canine metabolism room in disposable polyethylene bags. It is delivered to the kennel area in 60 quart amounts,

^{*}Vionate, E. R. Squibb and Sons, New York City, New York.

^{**}Krumettes, Allied Mills, Inc., Chicago, Illinois.

^{***}Hobart Manufacturing Company, Troy, Ohio.

which is sufficient for preparation of individual rations for a full kennel.

4. Cleanup

- a. All pan washing and mixing bowl washing is done in the kitchen with the exception of the isolation utensils which are washed and stored in the isolation rooms.
- b. All other pans and mixing bowls are stored in the kitchen storage area.

F. Incoming Isolation

The following procedure is followed for all incoming dogs:

1. All dogs, upon arriving at the Fission Product Inhalation Laboratory are placed in the isolation ward and kept under observation for a minimum of 21 days.
2. A standard clinical chart is maintained on the animal during the entire isolation period (See II., D., 2).
3. The Medical Records section sets up a projected schedule and issues work orders according to the schedule as follows:
 - a. Day 1 - The dogs are given 25% of a normal ration of food, and water ad libitum.
 - b. Day 2 - A physical examination is performed. A blood sample is collected and sent to the Department of Hematology Laboratory for a routine hemogram, a microfilaria examination and a blood parasite examination. A fecal sample is collected and sent to the Veterinary Laboratory for examination for internal parasites. The dogs are weighed and tattooed. A normal or prescribed ration is instituted.
 - c. Day 3 - The dogs are treated with the prescribed anthelmintic if necessary.
 - d. Day 5 - A urine sample is collected and sent to the Veterinary Laboratory for a complete urinalysis.
 - e. Day 6 - A standard radiographic survey is performed.
 - f. Day 6 to 21 - Any medication is prescribed and retesting

is performed.

- g. Day 17 - The dogs are vaccinated for canine distemper and infectious canine hepatitis^{*}, leptospirosis^{**}, and rabies^{***}. A fecal sample is collected and sent to the Veterinary Laboratory for examination for internal parasites.
 - h. Day 18 - The dogs are treated with the prescribed anthelmintic if necessary. A blood sample is collected and taken to the Department of Hematology Laboratory for a standard hemogram.
 - i. Day 21 - The dogs are treated for external parasites and weighed. A physical examination is performed by the veterinarian and if the examination and the results of the laboratory tests are all satisfactory, the dog is then released to the colony.
 - j. A second injection of leptospirosis vaccine is given 14 days following the initial inoculation.
4. The clinical chart is returned to Medical Records upon release from isolation.

G. Estrus Examination and Breeding

- 1. Breeding bitches are examined for estrus on Mondays, Wednesdays and Fridays. A work order and estrus examination form for this are issued to the chief animal caretaker.
- 2. When the bitch is reported in proestrus, a work order is issued for a series of vaginal smears to determine the exact time of estrus.
- 3. When the Veterinary Laboratory determines that the bitch is in estrus, the work order slip, with this report, is returned to Medical Records.
- 4. Medical Records checks with the chief animal caretaker as to which stud to use, then issues a work order to the care-

^{*}Distemperoid TC+, Fromm, Grafton, Wisconsin.

^{**}Leptobac, Fromm, Grafton, Wisconsin.

^{***}Rabvac, Fromm, Grafton, Wisconsin.

taker to breed the bitch.

5. After the dog has been bred, the caretaker completes and returns the work order to Medical Records. (Dogs are observed to insure proper mating.)
6. Medical Records determines the whelping date based on a 60 day gestation period. This information is posted in the animal's medical history and sent to the Veterinary Laboratory and kennel.

H. Whelping and Pediatrics

1. When a litter is born, the umbilical cords are immediately swabbed with iodine by the attending caretaker.
2. The bitch is given 10 units of pitocin, intramuscularly, immediately after completion of whelping.
3. Within six hours of completion of whelping, a vaginal culture is obtained and sent to the Veterinary Laboratory.
4. A report is made from the kennel to Medical Records on a litter report form. This form contains the following information:
 - a. Litter number (in sequential order).
 - b. Number of puppies:

Puppies are assigned a tattoo designation and are temporarily marked by clipping notches in hair over the back. Male puppies are assigned first with the litter number followed by an alphabetic designation starting with A. The females are allocated in the same manner after the last male.
 - c. Dam
 - d. Sex of puppies
 - e. Weight of puppies
 - f. Puppies born dead
5. If a puppy is born dead or dies within the first 48 hours, the Veterinary Laboratory and veterinarian are notified immediately for a post-mortem study.

6. Medical Records inserts the information on the dam's whelping record and sets up a projected pediatrics schedule as follows:
 - a. Week 3 - The dogs are weighed. A fecal sample is sent to the Veterinary Laboratory for examination for internal parasites, and, if necessary, the dogs are treated with the prescribed anthelmintic.
 - b. Week 6 - The dogs are weighed, weaned and tattooed. The dogs are given canine globulin* according to their body weight. A fecal sample is sent to the Veterinary Laboratory for examination for internal parasites.
 - c. Week 8 - The dogs are vaccinated for canine distemper and infectious canine hepatitis. A fecal sample is sent to the Veterinary Laboratory for examination for internal parasites and, if necessary, the dogs are treated with the prescribed anthelmintic.
 - d. Week 10 - The dogs are vaccinated for leptospirosis.
 - e. Week 12 - The dogs are vaccinated for canine distemper, infectious canine hepatitis and leptospirosis. A fecal sample is sent to the Veterinary Laboratory for examination for internal parasites. The dogs are treated with the prescribed anthelmintic if necessary. The dogs are weighed.
 - f. Week 16 - The dogs are vaccinated for rabies.
 - g. Week 26 - The dogs are vaccinated for canine distemper, infectious canine hepatitis and leptospirosis.

I. Routine Fecal Examinations

1. Medical Records schedules an examination for internal parasites once a month for every dog in the colony which is four months of age or older.
2. Specimens are collected by an animal caretaker early in the

*Globulon, Pitmann Moore Company, Indianapolis, Indiana.

morning and placed in a numbered plastic bag.

- a. The caretaker takes the specimen to the Veterinary Laboratory.
- b. The laboratory technician grossly examines the fecal material and performs a fecal floatation.
- c. The veterinarian prescribes for dogs with ova present.
- d. A second fecal examination is scheduled 21 days post-treatment for those positive.

J. Immunization Schedule

1. Annual immunization

Vaccinations are given annually to all dogs for canine distemper, infectious canine hepatitis and rabies. These vaccinations are scheduled on the anniversary of their date of birth.

2. Semiannual immunization

Vaccinations are given every six months to all dogs for leptospirosis. These vaccinations are scheduled on the anniversary of their date of birth and again six months later.

K. Weighing

1. Medical Records schedules every dog in the colony that is four months of age or older to be weighed once a month.
2. The procedure for weighing is performed by the caretaker personnel at the kennel site.

L. Medical Records

1. Medical histories

All medical histories are maintained at present, by the Medical Records section. The history is composed of:

- a. General chronological history page.
- b. Laboratory report page.
- c. Lineage page.
- d. Litter record page (breeding colony).
- e. Clinical research pages (experimental colony).

2. Issuance of work orders

- a. All work orders are issued by the Medical Records clerk.
- b. The work order form consists of a multiple carbon with an original and four copies which have the following distribution:
 - (1) Original copy is posted in the animal's medical record file.
 - (2) Second copy is sent to the Department of Biomathematics for computer input.
 - (3) Third copy is distributed to the veterinarian on duty.
 - (4) Fourth copy is the Veterinary Laboratory file or supervisor's copy.
 - (5) Fifth copy is the control copy for Medical Records.

3. Scheduled work orders

The Medical Records clerk maintains a log book for scheduling of the following routine procedures:

- a. Isolation procedures
- b. Estrus examinations
- c. Pediatrics procedures
- d. Laboratory work
- e. Semiannual immunizations
- f. Annual immunizations
- g. Clinical research procedures

4. Unscheduled work orders

Unscheduled work orders originate from observations made by the veterinarian during the course of daily rounds, as well as from observations recorded in the area log books by caretaker personnel. These are handled with the standard work order form.

5. Completed work orders

After work orders are completed, results and the date of completion are written on the form and returned to the Medical Records section for posting and distribution.

6. System automation

All medical histories will be maintained completely in the future by the computer system of the Department of Biomathematics. This consists of a Flexowriter^{*} input of coded data to the Burroughs 5000^{**} computer system. This computer system has the capability to store and daily update the animal histories. This gives the department the capability to obtain routinely the following information:

- a. Complete chronological animal histories.
- b. Daily report of previous observations, treatment and activity within the animal colony.
- c. Work orders for periodic routine procedures.
- d. Report of uncompleted work after expiration of anticipated completion date.
- e. Report of animals available for specified experimental assignments.
- f. Analysis of numerical information as required.
- g. Report of frequency of occurrence summaries as specified.

III. SMALL LABORATORY ANIMAL COLONY

A. Daily Rounds

1. The veterinarian on duty makes daily rounds of the small animal isolation, stock, experimental and metabolism rooms.
2. The chief animal caretaker of the small animal quarters makes the same rounds twice a day.
3. Comments are made, by the veterinarian during rounds, into a portable recorder which include:
 - a. Observations regarding the health of the animals.
 - (1) Those made by the veterinarian during rounds.

^{*}Friden, Inc., San Leandro, California.

^{**}Burroughs Corp., Detroit, Michigan.

(2) Those made by caretaker personnel during the previous 24 hour period and recorded in the area log books that are maintained in the small animal quarters.

b. Treatment of animals by the veterinarian.

c. Initiation of work orders.

(1) Changes in rations

(2) Orders for medication

(3) Orders for laboratory work

(4) Management problems

(5) Miscellaneous

B. Incoming Isolation Schedule

The following procedure is followed for all incoming small laboratory animals:

1. All small laboratory animals, upon arrival at the Fission Product Inhalation Laboratory are placed in the proper isolation room and kept under observation for a minimum of 14 days.

2. A projected schedule is established for the examination of the small laboratory animals during their isolation period as follows:

a. Day 1 - Animals are received and placed in the proper isolation room. If the group of animals is rats, they are placed two to a cage with the first rat in each cage receiving a tail mark with the application of a suitable dye. If the animals are mice, they are placed six to a cage and each is tail-marked with one of the following identifying dyes:

(1) Purple (gentian violet)

(2) Green (malachite green)

(3) Red (safranin dye)

(4) Black (tattoo ink)

(5) Blue (Wright's stain)

If the animal is a guinea pig, it is placed singly in a cage and marked with a flexible animal collar. The standard cage card is placed upon each cage with the indicated information.

- b. Day 2 - A fecal sample is collected and taken to the Veterinary Laboratory for culture for the presence of Salmonella sp. Another fecal sample is taken to the Veterinary Laboratory for an examination for internal parasites. Each of the animals is individually examined to see that it is in a normal state of health.
- c. Day 3 - A blood sample is collected and taken to the Department of Hematology Laboratory for a routine hemogram from selected animals from within each isolation group.
- d. Day 4 - An individual animal record card is filled out for each of the animals. Each animal is weighed. If the animal is a rat, a tattoo is placed in the loose skin on the back.
- e. Day 10 - A sample from the water bottle of each of the animal cages is collected and sent to the Veterinary Laboratory for examination for Pseudomonas sp.
- f. Day 12 - Each animal is weighed and the weight recorded on the individual animal record card.
- g. Days 2 through 14 - Any medication, retesting and re-examination as may be necessary are performed throughout the isolation period.
- h. Day 14 - The animals are released for experimental use.

C. Stock and Experimental Rooms

- 1. All animals are checked daily to see that ample feed is present at all times, and all water bottles have adequate water within them.
- 2. Collection trays underneath all of the small animals are changed three times a week. This waste is placed in the

lined garbage cans which are emptied into the outside dumpster. Cleaning is not limited to three times a week. If it is necessary, it is done daily.

3. Water bottles are washed within the provided automatic bottle washer^{*} twice weekly.
4. All stainless steel drinking tubes and rubber corks are autoclaved at 15 pounds pressure for 30 minutes before placing on a clean water bottle.
5. Water bottles in use are not changed to other cages until they have been rewashed.
6. All animals in a cage are changed to a clean cage along with the cage identification card each week. This schedule is flexible and depends upon the capacity of the colony.
7. Cages and racks are washed in the cage washer^{**} weekly.
8. Each cage is opened daily and all animals in the cage observed. Any change in behavior or condition of the animals is written into the small animal area log book and, at the discretion of the caretaker as to the severity of the condition, the chief animal caretaker is notified.
9. Temperature in the rooms is checked twice daily to see that it has remained between 68°F and 80°F. The recording graph is changed weekly and a notation made in the small animal area log book as to dates and the period of time in which the temperature was not within this range.
10. Humidity recordings are checked twice daily to see that the humidity has been maintained between 40% and 60%. Weekly the graph is collected and all dates and periods of time in which the humidity was not within this range are recorded in the area log book.

^{*}Model 3000, R. G. Wright Co., Buffalo, New York.

^{**}Model 6000, Better Built Machinery Corp., New York City, New York.

11. Any special animal care procedures for the animals are performed as instructed.
12. The floors in the small animal rooms are washed weekly, utilizing the Mikro-spray^{*} unit. This is repeated as needed.
13. The sink, drainboard and shelf behind the sink are washed daily with detergent and water.
14. Every effort is made to keep the small animal rooms neat and clean at all times.

D. Metabolism Rooms

Urine and fecal samples are collected according to the standard collection procedure³. These are used to determine their isotopic content.

E. Inventory

1. Removal of animals from animal quarters

a. Stock colony

If the animals are to be drawn from the stock colony within the small animal quarters, the following procedures are followed:

The animals are logged out on the animal requisition form that is kept within the stock room. They are moved from the room in transfer cages to avoid taking stock cages out of the animal colony. The animal requisition forms contain the date, animal number, purpose and initial of the individual drawing the animal. If the animal is returned to the stock room, the date, animal number and initials of the person returning the animal to stock are placed on the animal requisition form.

b. Experimental colony

If the animal is withdrawn from the experimental animal

^{*}Economics Laboratory, Inc., Saint Paul, Minnesota.

quarters the following procedure is followed:

The date, animal number, disposition and initials of the individual removing the animal are written in the area log book maintained within the experimental animal room.

2. Maintenance of animal inventories

A daily inventory is taken of all small animals in the facility and recorded on the inventory card located with each cage battery. Any changes found from the previous days inventory are checked against the area log book and are recorded on the individual animal record cards by the Medical Records section. The animal requisition form from the stock room is transferred daily to the Medical Records section for the posting of the experimental assignment on the individual animal record card.

F. Medical Records

1. Medical histories

All medical histories are maintained at present by the Medical Records section. This history is entered on an individual animal record card and is composed of:

- a. Animal number
- b. Date of arrival
- c. Weight on arrival
- d. Experimental number
- e. Species
- f. Strain
- g. Source
- h. Sex
- i. Date of birth
- j. Shipment number
- k. Pre-experimental examination data
- l. Clinical research data
- m. Observations
- n. Location

2. Work orders

All work orders are processed the same as described for the large animal colony.

3. System automation

All medical histories will be maintained completely, in the future, by the computer system of the Department of Biomathematics. The medical histories of the small laboratory animals, as previously documented, are integrated into the complete system as described for the large animal colony.

G. Procurement

1. Requisitions are made on the animal order card 30 days prior to the date needed by the department requesting the animals. Arrival is requested on Monday or Tuesday during each week.
2. The animal order card is delivered to the Department of Veterinary Medicine.
3. The standard purchase order is initiated to the commercial firm supplying the animals. This contains all of the information requested on the animal order card, as well as shipping instructions.
4. Animals are picked up at point of arrival in Albuquerque by a member of the Department of Veterinary Medicine and transferred to the Fission Product Inhalation Laboratory. Schedules of shipments are maintained so that personnel may be on hand upon arrival of the animals requisitioned.

SUMMARY

The management procedures for the animal colonies serving the Fission Product Inhalation Program are documented so that relevant information is available for all personnel on the program, as well as interested individuals from other laboratories.

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